Alabama Course of Study Standard for 8th Grade Science

*** The standards are organized in the order; in which, they are covered.***

1.) Identify steps within the scientific process.

- Applying process skills to interpret data from graphs, tables, and charts
- Identifying controls and variables in a scientific investigation
- Measuring dimension, volume, and mass using Système International d'Unités (SI units)
- Identifying examples of hypotheses
- Identifying appropriate laboratory glassware, balances, time measuring equipment, and optical instruments used to conduct an investigation

Standard 1: Terms to Know				
Bar Graph	Data	Hypothesis	mass	slope
Control	Dependent variable	Independent variable	Scientific method	variables
Constant	Experiment	Line graph	SI units	volume

Common Lab Instruments *(know function of each)*				
Beaker	Graduated cylinder	Pipette	Striker	Test tube
Bunsen burner	Lab coat or apron	Ring stand, ring clamps	Stirring rod	thermometer
Erlenmeyer flask	Lab stand	Safety goggles	Spatulas /scoopulas	Tongs/forceps
Funnel	Mortar and pestle	Scale	Stop watch	Triple beam balance

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Define matter and describe it based on its physical and chemical properties.
*Matter is fundamental to study the chemistry portion of the Physical Science course of study: however, it is not included in the ALCOS.

7.) Describe states of matter based on kinetic energy of particles in matter.

Matter & Standard 7: Terms to Know				
Matter	molecules	Gas	freezing	Physical change
Mass	Element	Solid	Boiling	Chemical change
Weight	Compound	Liquid	Evaporation	Physical property
Newton	mixture	Density	Condensation	Chemical property
Atom	Liters	melting	sublimation	States of matter
Volume				

Standard 2: Terms to Know		
Atom	Isotope	Proton
Electron	Neutron	
Ion	Nucleus	

2.) Describe the structure of atoms, including the location of protons, neutrons, and electrons.

- Identifying the charge of each subatomic particle
- Identifying Democritus and Dalton as contributors to the atomic theory

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3.) Determine the number of protons, neutrons, and electrons, and the mass of an element using the periodic table.

- Locating metals, nonmetals, metalloids, and noble gases on the periodic table
- Using data about the number of electrons in the outer shell of an atom to determine its reactivity

Standard 3: Terms to Know				
Atom	Atomic mass	Atomic number	Bohr diagram	Electron
Element	Group (family)	Half-life	ion	isotope
Lewis Dot Structure	Metal	Metalloid	Neutron	nonmetal
period	Periodic table	Proton	radioactivity	Reactive (reactivity)
Transition metals	Valence electron			

Standard 4 and 7.1: Terms to Know				
catalyst	Chemical equation	Chemical formula	Chemical reaction	coefficient
concentration	Endothermic reaction	Exothermic reaction	Law of conservation of mass	Rate of reaction
Product	reactant	subscript	Surface area	temperature

4.) State the law of conservation of matter.

- Balancing chemical equations by adjusting coefficients

7.1) Explaining effects of temperature, concentration, surface area, and catalysts on the rate of chemical reaction.

5.) Differentiate between ionic and covalent bonds.

- Illustrating the transfer or sharing of electrons using electron dot diagrams

Standard 5: Terms to Know				
Anion	Bohr Diagram	Cation	Chemical bond	Compound
Covalent bond	Element	Ion	Ionic bond	Lewis Dot Structure
molecule	Nonpolar covalent bond	Polar covalent bond	Valence electrons	

Standard 6: Terms to Know				
acid	Base	Concentration	Diffusion	Diluted (unsaturated)
Hypertonic	Hypotonic	Isotonic	mixture	neutral
Osmosis	pH scale	Saturated	Solubility	Solute
Solution	Solvent	Suspension	supersaturated	

6.) Define solution in terms of solute and solvent.

- Defining diffusion and osmosis
- Defining isotonic, hypertonic, and hypotonic solutions
- Describing acids and bases based on their hydrogen ion concentration

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8.) Identify Newton's three laws of motion.

- Defining terminology such as action and reaction forces, inertia, acceleration, momentum, and friction
- Interpreting distance-time graphs

Standard 8: Terms to Know				
Acceleration	Action/reaction forces	Air resistance	Balanced forces	Collision
Conservation of momentum	distance	Distance-time graph	Frame of reference	Friction
Force	Gravity	Inertia	Mass	momentum
Motion	Net force	Newton 1st Law of Motion	Newton 2nd Law of Motion	Newton 3rd Law of Motion
Position	Rate of change	Reference point	slope	Speed
Time	Unbalanced forces	Vector	Velocity	Velocity-time graph
weight				

Standard 9: Terms to Know				
Compound machine	distance	efficiency	Energy	fluid
force	Friction	Fulcrum	horsepower	Inclined plane
Joule	kinetic	lever	Machine	Mechanical advantage
Mechanical energy	Potential	power	Pressure	Pulley
screw	Simple machine	time	Watt	wedge
Wheel and axle	work			

9.) Describe how mechanical advantages of simple machines reduce the amount of force needed for work.

- Describing the effect of force on pressure in fluids

Example: increasing force on fluid leading to increase of pressure within a hydraulic cylinder

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10.) Differentiate between potential and kinetic energy.

Examples:
- potential-rock resting at the top of a hill,
- kinetic-rock rolling down a hill

11.) Explain the law of conservation of energy and its relationship to energy transformation, including chemical to electrical, chemical to heat, electrical to light, electrical to mechanical, and electrical to sound.

Standard 10 & 11: Terms to Know				
calorie	Chemical energy	Conduction	Convection	Electromagnetic energy
Energy	Gas	Joule	Heat	Kinetic energy
Kinetic theory of matter	Liquid	Mechanical energy	Nuclear energy	Potential energy
Radiation	Solar energy	Solid	Specific heat	Temperature
Thermal energy	Thermal expansion	thermometer		

12.) Classify waves as mechanical or electromagnetic.

Examples:
- mechanical-earthquake waves;
- electromagnetic-ultraviolet light waves, visible light waves

- Describing how earthquake waves, sound waves, water waves, and electromagnetic waves can be destructive or beneficial due to the transfer of energy
- Describing longitudinal and transverse waves
- Describing how waves travel through different media
- Relating wavelength, frequency, and amplitude to energy
- Describing the electromagnetic spectrum in terms of frequencies
  Example: electromagnetic spectrum in increasing frequencies-microwaves, infrared light, visible light, ultraviolet light, X rays

Standard 12: Terms to Know				
Amplitude	Crest	Decibel	Diffraction	Diffusion
Electromagnetic spectrum	Electromagnetic waves	Frequency	Gamma rays	Hertz
Infrared light	intensity	Interference	Longitudinal wave	Mechanical waves
Medium (media)	Microwaves	Pitch	Radio waves	Reflection
Refraction	Transverse wave	trough	Ultraviolet light	Visible light
Wave	Wavelength	x-ray		